CASE STUDY SUMMARY

Hilton Palm Springs' centralized energy management system automates HVAC controls.

- Participant: Hilton Palm Springs
- Building Type: Hotel
- Site Size: 205,000 ft²
- Project Cost: $540,000
- Project Incentives: $205,000
- Average Demand Reduction: 275 kW
- Average Annual Energy Use 10.7 kWh/ft2-yr
- Primary Benefit: Energy savings and customer comfort

Hilton Palm Springs reduced energy demand by 48 percent with enhanced automation and associated technology.

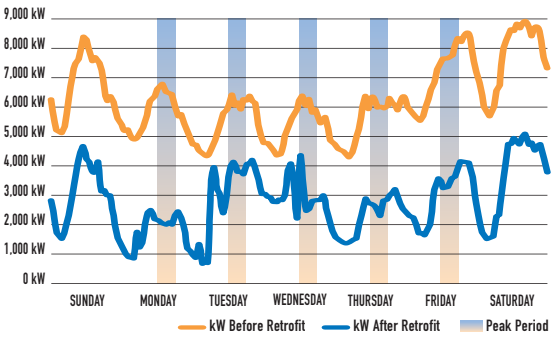
Using a combination of enhanced automation strategies and energy efficient equipment, Hilton Palm Springs sheds demand during high cost periods. Since 2000, the resort has reduced peak demand by 275 kW, while increasing customer satisfaction.

- High on-peak energy costs
- Irregular energy needs in conference rooms

PROBLEM

Operating a 205,000 square foot hotel in the California desert is a challenge. The Hilton Palm Springs is faced with keeping guests comfortable through wide temperature extremes (the highs eclipse 120 degrees Fahrenheit in the summer and the lows dip into the 30's during in the winter) while managing high energy costs. In addition to 260 customer rooms, the hotel also maintains 18,000 square feet of meeting space with constantly changing occupancy levels.

Enhanced automation cuts average energy demand by nearly 50 percent.



The EMS and HVAC improvements reduced the Hilton's average electric demand by over 275 kW, nearly 50 percent of the total load at the Palm Springs resort. The weekly demand curves compare a pre-retrofit week (August 6–12, 2000) to a post-retrofit week (August 1-7, 2004) with similar climate and occupancy conditions. The gray bars indicate the on-peak highest energy cost from noon to 6PM, Monday thru Friday.

- Upgrade energy management system
- Shift peak loads to non-peak periods
- Install advanced chiller optimizer

SOLUTION

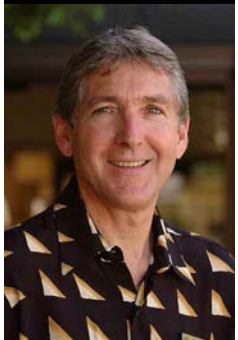
Hilton Palm Springs has been a progressive user of enhanced automation for over two decades, dating back to its first installed energy management system (EMS) in 1984. It has recently upgraded to a third generation EMS to stay current with advancing technology. The new system is linked to programmable thermostats throughout the hotel and is on a pulse meter that monitors real-time energy use through a new energy information system (EIS).

From a centralized computer, the building engineers establish start/stop set points that correspond to occupancy levels in the meeting rooms. For example, at the beginning of each week a building engineer enters the weekly meeting schedule into the system, and the EMS then regulates the HVAC to match occupancy periods. The operator sets a target room temperature, and the system determines and sets the necessary ramp up time needed for the HVAC system to reach a desired setpoint. The Hilton complements this load shedding strategy with a procedure to shift peak energy demand from the ice machines, dishwashers, and in-house laundry to non-peak time periods.

The Hilton has improved its overall HVAC and EMS capability by upgrading two 140-ton chillers with optimizing equipment and by retrofitting all ¼ to 30-horsepower motors with high efficiency motors and installing variable frequency drive evaporator motors in the walk-in coolers.

"The energy management system allows my engineers to control meeting room temperatures from a centralized location, freeing up their time and eliminating the need to disturb meetings already in progress."

Chuck Stone, Director of Engineering, Hilton Palm Springs



"As energy prices fluctuate, it's especially important to fully understand and have control over the building's energy performance. Enhanced automation allows us to do that."

- Centralized HVAC control
- Energy and cost savings
- Real-time and archived energy data

BENEFITS

Hilton's energy management strategies have helped cut the overall average building demand (kW) by 48 percent compared to pre-retrofit levels. The Hilton can now optimize comfort levels for building occupants while reducing energy costs.

The EMS has streamlined maintenance operations by providing a centralized location to adjust room environments. Prior to the upgraded EMS, building engineers would have to physically monitor several meeting rooms at once, often interrupting ongoing meetings. Now they can monitor and control all room temperatures through a convenient centralized computer—freeing up staff time and reducing comfort complaints from meeting participants.

The energy trending data from the EIS—particularly kW, kWh, and cost data—has become an important tool for Hilton's building engineers to track and analyze building performance. They have used this data to justify new energy improvements such as chiller optimization, using solar water heaters for the 110,000 gallon swimming pools and installing two 140 kW cogeneration units with a 50-ton absorption chiller to generate power during peak period. The chiller optimizer alone saves $36,000 annually with improved temperature set points based on outside air temperature and return water temperature.

PROJECT SITE DESCRIPTION

- Location: Palm Springs, CA
- Size: 205,000 ft2, 260 guest rooms and 18,000 ft^2 of meeting space
- Space Function: Hotel /conference space
- Site Contact: Chuck Stone, Director of Engineering, Hilton Palm Springs

Equipment Installed

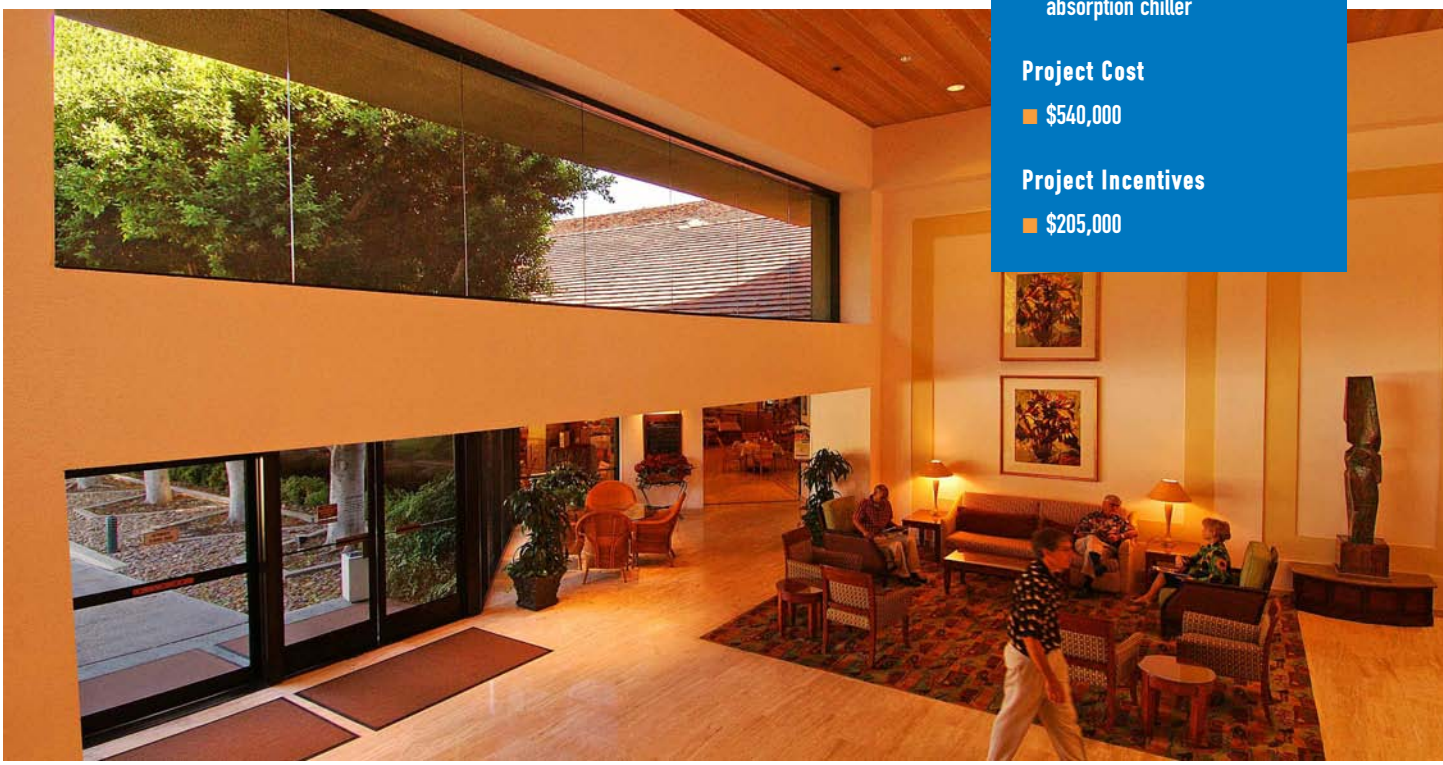
- Honeywell Light Commercial Building Solution (LCBS)
- Honeywell LonSpec configuration software
- Honeywell T7300 programmable thermostats
- Millennium Series Chiller Optimizer
- Hess Microgen and Flexible Energy cogeneration units and absorption chiller

Project Cost

- $540,000

Project Incentives

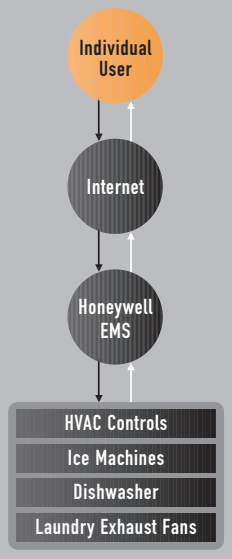
- $205,000



Technical Information

Hilton Palm Springs uses a Honeywell Light Commercial Building Solution (LCBS) energy management system to integrate all its heating, ventilation, and air conditioning equipment. The LCBS is combined with the Honeywell LonSpec configuration software, which allows operators to control set points and monitor real-time and archived energy trends. The LonSpec software communicates with Honeywell's T7300 Communicating Commercial Programmable Thermostat as part of the building's open direct digital control (DDC) automation system. The DDCs are a networked system of microprocessor-based controllers connected to devices that monitor and control the building's HVAC equipment.

Schematic of Hilton Palm Springs Energy Management System



Hilton Palm Springs takes advantage of three primary start/stop functions of the system to reduce its energy demand. First, the EMS is programmed to start up the HVAC system one hour prior to a meeting's start time in order to reach a desired temperature level. Conversely, the system ramps down the HVAC as the meeting is scheduled to end. Secondly, the system can tell if the one-hour start up time will be insufficient (based on indoor and outdoor temperatures) and will pre-condition the space to reach the desired set-point before the meeting starts. This function acts as a safety net for the hotel and guards against comfort complaints. The third function allows the operator to set upper and lower temperature boundaries for different building zones. This keeps the hotel within a comfortable temperature band and protects the system against large localized demands.

The Hilton installed a Millennium Series Chiller Optimizer with ELECTRA software on their two 140-ton chillers to add further efficiency performance to the HVAC system. The Optimizer has achieved 37 percent electricity savings on the chillers by fine tuning energy levels based on 5-minute interval testing of outside temperature, chilled water supply, and return water temperature.

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TAKING THE NEXT STEP

A list of certified demand response contractors is available at: www.energy.ca.gov/demandresponse/documents/qualified_firms.html

Free resources are available from the California Energy Commission at: www.energy.ca.gov/enhancedautomation/

- Business Case Guidebook
- Technical Options Guidebook
- Case Studies
  1. Alameda County
  2. Hewlett-Packard
  3. Comerica Building
  4. Foothill-De Anza Community Colleges
  5. Staples, Inc.
  6. Doubletree Hotel Sacramento
  7. Albertsons
  8. Arden Realty/next>edge
  9. Contra Costa County
  10. Hilton, Palm Springs
  11. PETCO
  12. Swinerton Inc.

Research on Demand Response:

- http://drrc.lbl.gov/drrc-1.html

Additional Resources:

- www.fypower.org/now/demand_resp.html
- www.sdge.com/business/drp_index.shtml
- www.pge.com/biz/demand_response/
- www.sce.com/RebatesandSavings/LargeBusiness/DemandResponse/